

LEADING
APPLICATION SOFTWARE SECTORS
FOR
MAINFRAME, MINICOMPUTER, AND
PERSONAL COMPUTERS

INPUT



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APPLICATION SOFTWARE SECTORS
FOR
MAINFRAME, MINICOMPUTER, AND
PERSONAL COMPUTERS

PREPARED FOR

PACIFIC TELESIS

INPUT
1280 Villa Street
Mountain View, CA 94041

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ZPTI
INPUT



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BANKING AND FINANCE INDUSTRY SECTOR ANALYSIS

APPLICATION SOFTWARE

INTRODUCTION:

This report considers all three computer platforms: mainframe, minicomputer, and microcomputer together. The reason for this is that microcomputer and minicomputer software is largely offered by the same suppliers who provide mainframe software. Where distinctions need to be made between minicomputer or microcomputer software vendors and/or markets and the mainframe suppliers, it is done so within the body of this report. Because of the great similarities in the three platform types within this market, it was felt that a clearer definition of them could be made by taking them all together.

There are no key players that offer only minicomputer or microcomputer software. At this time, these companies are too small to warrant separate analysis.

1. KEY PLAYERS

- This market is dominated by major companies who have small corporate stakes in this business. The three largest key players are all mainframe computer manufacturers: IBM, Unisys, and NCR, who together share 31% of the market.
- The typical major vendors in this market derive less than 10% of their corporate revenues from it.
- Twenty one companies share 60% of the market as shown in Exhibit 1. on the following page.

EXHIBIT 1

INDUSTRY SPECIFIC BANKING AND FINANCE APPLICATION SOFTWARE MARKET

COMPANY	1987 BANKING APPLICATION SOFTWARE US REV \$M	PERCENT OF TOTAL	CORPORATE STAKES IN THIS BUSINESS	PRINCIPAL COMPUTER PLATFORM	OWNERSHIP
IBM	170	12.4%	VERY SMALL	MAINFRAME	MAJOR PUB.
UNISYS	150	10.9%	VERY SMALL	MAINFRAME	MAJOR PUB.
NCR	100	7.3%	VERY SMALL	MAINFRAME	MAJOR PUB.
MARSHALL & ISLEY	65	4.7%	SMALL	MAINFRAME	MAJOR PUB.
KIRCHMAN	45	3.3%	MAJOR	MAINFRAME	PRIVATE
SEI	40	2.9%	MEDIUM	MAINFRAME	PUBLIC
UCCEL (C.A.)	40	2.9%	SMALL	MAINFRAME	MAJOR PUB.
HOGAN SYSTEMS	30	2.2%	MAJOR	MAINFRAME	PUBLIC
AMER. MGM SYS	26	1.9%	SMALL	MAINFRAME	MAJOR PUB.
CITICORP I.S.	23	1.7%	VERY SMALL	MAIN & MINI	MAJOR PUB.
CULLINET	22	1.6%	SMALL	MAINFRAME	MAJOR PUB.
FISERVE (FIRST DATA)	20	1.5%	MEDIUM	MAIN & MICRO	
CDC	20	1.5%	VERY SMALL	MAINFRAME	MAJOR PUB.
STOCKHOLDERS SYS	14	1.0%	MAJOR	MAINFRAME	PUBLIC
SYSTEMATICS	11	0.8%	SMALL	MAINFRAME	PUBLIC
DELUXE PRINTER	10	0.7%	VERY SMALL	MAINFRAME	MAJOR PUB.
MELLON BANK	10	0.7%	VERY SMALL	MAINFRAME	MAJOR PUB.
KOCH SYSTEMS	8	0.6%	MAJOR	MAINFRAME	PRIVATE
MTECH	6	0.4%	VERY SMALL	MAINFRAME	MAJOR PUB.
DATA ARCHITECHS	5	0.4%	SMALL	MINICOMPUTER	PUBLIC
NATIONAL DATA	5	0.4%	SMALL	MAINFRAME	PUBLIC
SUBTOTAL	820	59.6%			
ALL OTHER VENDORS	556	40.4%			
INDUSTRY TOTAL	1376	100.0%			
MICROCOMPUTER	187	13.6%			

MOST MICROCOMPUTER SOFTWARE IS OFFERED AS AN ADJUNCT TO MAINFRAME PRODUCTS.

- The principal computer platform that most of these vendors offer their products on are mainframe systems. All of the major vendors also offer software on minicomputers and microcomputers.
 - Only one vendor, Data Architechs, offers software primarily for minicomputers.
 - None of the vendors offer software primarily for microcomputers.
- Only four vendors have a major corporate stake in this market.
 - Two of these companies are privately held:
 - > Kirchman
 - > Koch Systems
 - Two are public companies
 - > Hogan Systems
 - > Stockholders Systems
- A brief financial profile of the two public companies with major stakes in this market and an average of the two is shown in exhibit 2.

EXHIBIT 2

	STOCKHOLDERS SYSTEMS SYSTEMS 31-Mar-87	HOGAN SYSTEMS SYSTEMS 31-Mar-87	AVERAGE
	\$MILLIONS	\$MILLIONS	\$MILLIONS
REVENUE	13.99	44.09	29.04
ATP BEFORE EXT	2.34	5.33	3.83
EQUITY	13.49	36.13	24.81
ROE	17.3%	14.7%	15.5%
SHARES OUT	3.51	14.33	8.92
PRICE PER SHARE	8.88	15.00	11.94
MARKET VALUE	31.17	214.97	106.50
MARKET TO BOOK	231.1%	594.9%	429.2%
MARKET SHARE	1.0%	3.0%	

PRINCIPAL PRODUCTS:

HOGAN SYSTEMS: INTEGRATED BANKING SYSTEMS

STOCKHOLDERS SYSTEMS: TRANSFER AGENT AND SHAREHOLDER ACCOUNTING
ELECTRONIC FUNDS TRANSFER

- More detailed profiles of Hogan Systems and Koch Systems Corp. are provided in the attachments.

DISTRIBUTION CHANNELS:

- Mainframe and minicomputer manufacturers distribute all of their software directly to their end users.
 - In some cases, where the software sells in foreign markets, a licensed foreign distributor will be employed. But since most software in this market is country specific, relatively little software is distributed in this manner.
 - Electronic Funds Transfer is one market area that has an international flavor.
- Most microcomputer software is provided by the mainframe and minicomputer software developers and all of that is sold directly to end users.
 - Independent micro software vendors sell most of their software directly to end users.
 - Some independents also sell through VAR's or through marketing agreements with hardware vendors, but this represents a relatively small part of the market.

2. Strength of Competitive Rivalry

A. Sector Characteristics

1. User expenditures are shown in Exhibit 3.

EXHIBIT 3

INDUSTRY-SPECIFIC SOFTWARE PRODUCTS USER EXPENDITURE FORECAST FOR THE BANKING AND FINANCE SECTOR

	(\$M) 1986	86-87 GROWTH	(\$M) 1987	AAGR 87-92	(\$M) 1992
MAINFRAME	900	18%	1060	13%	1950
MINICOMPUTER	99	30%	129	28%	442
MICROCOMPUTER	131	43%	187	28%	643
TOTAL	1130	22%	1376	17%	3035

- Although Mainframe software is projected to continue to have the major share of the market through the next five years, the highest growth is projected for mini and micro computer software.

2. Profit Margins

- After tax profit margins for this sector range on average from 10% to 20%.
- The dominant players' profit margins are generally higher and more consistent than the population as a whole.
- The two key public players identified above have the following after tax profit margins
 - > Hogan: 12% before extraordinary income (which would double margins)
 - > Stockholders: 17%

B. Fixed or Storage Cost	Mainframe	Mini	Micro
1. Support Activity			
● Firm Infrastructure	10%	8%	7%
● Human Resources	1%	1%	1%
● Technology Dev.	30%	33%	28%
● Procurement	1%	1%	2%
2. Primary Activities			
● Inbound Logistics	1%	1%	2%
● Operations	1%	1%	2%
● Outbound Logistics	1%	1%	2%
● Marketing & Sales	10%	16%	20%
● Service	30%	25%	20%
3. Profit			
● TOTAL	15%	13%	16%
● TOTAL	100%	100%	100%

C. Intermittent over capacity

- The greatest impact on supply versus demand is technology, primarily hardware. When a new generation of hardware is introduced, software based on the new technology becomes in great demand, while the old software suffers rapid obsolescence.
 - Mainframes are impacted the least
 - Microcomputers are impacted the most
- Generally, the greater the investment in hardware and software, the more users have resistance to change and upgrades.
- To a lesser extent, this sector is impacted by the following forces:
 - Economic cycles
 - Legislative/regulatory change

D. Product differences/Brand Identity

- Software in this sector is greatly influenced by the brand of the computer for which it is designed.
 - 80% of all software is made for IBM on mainframe computers.
 - 60% of minicomputer software is developed for IBM. The balance is for DEC, Wang, NCR, Unisys, and Tandem.
 - 90% of microcomputer software is developed for IBM and compatible clones, the balance for Wang and others.
- Brand identity in software arises through technology advances that result in a new "standard".
- Brand identity is also heavily based on the quality of support and service.
 - Response to customer needs builds strong customer loyalty.
 - Product enhancements on a continuing and responsive basis also builds brand loyalty.

E. Concentration, fragmentation and balance

- There are approximately 20,000 customers versus 200 significant suppliers.
 - 60% of the mainframe, minicomputer, and microcomputer software expenditures are with less than 25 vendors.
 - Only eight vendors have more than a 2% share of the software market.
 - The fragmentation is greater when one considers that the 2% is divided among mainframe, minicomputer, and microcomputer software.
- The largest independent supplier of minicomputer software is Data Architects who has about five million dollars in revenue and less than 5/10 of 1% of market share.
- No independent vendor of microcomputer software is known to have more than one million dollars in revenue which is well below 1/10 of 1% of market share.
- The players are extremely unbalanced in terms of size of revenues and profitability.
 - Large firms tend to dominate the market.
 - Small firms make very little or no profit until they become a leader in their market niche.
- Small firms can be very profitable with leading edge proprietary technology or application knowledge.
- Many of the key players subsidize their software operations through ancillary activities such as:
 - Hardware manufacturing
 - Processing Services
 - Banking Operations
 - Professional Services

F. Competitive Dynamics

- Competitors are similar in that they all compete fiercely in a cut throat manner.
 - Price cutting is endemic.
 - Special deals are widespread
 - Competitive environment is similar for all computer platform types
- Market share is changing dramatically among the independents through acquisition of competitors.
- Market share among hardware manufacturers has been and will continue to be relatively stable.
- Consolidation among smaller firms through mergers is nearly essential for survival.
- There is virtually no cooperation among vendors.

G. Corporate stakes

- 15 of the 21 leading vendors have small to very small corporate stakes in this market as shown in exhibit 1.
- Small independent software companies are the only vendors who have a major stake in this market.
 - The only key player with a major stake in this market for minicomputer software is Data Architects with five million dollars in revenue.
 - The largest vendor of microcomputer software has less than one million dollars in revenue.
- The few firms in the top twenty one who have a major stake in this market are prime acquisition candidates.

H. Exit Barriers

- Mainframe and minicomputer software vendors have significant exit barriers in that they have continuing maintenance responsibilities for their products.
 - Although contractual commitment is typically only for one year, the emotional commitment is great.
 - Most major vendors have other business relationships with customers which further commit them to a continuing responsibility for their software products.
- Independent microcomputer software suppliers have very little barriers to exit in that their maintenance commitments are almost nonexistent.

3. Entry Barriers

A. Economies of scale/Learning curve

- Product development cost are so high that large scale is extremely important to profitability.
- Longevity is far less important to profitability than other factors.
- Important factors in profitability include:
 - Application knowledge
 - Technological expertise
 - High investment in technological development
 - Strong effective sales organization
- Major barrier to entry is customer investment in training of personnel and cost of conversion to new systems.

B. Capital requirements

- Capital requirements are relatively low.
 - Initial investment is in software development which is usually in a range of 1 to 5 million dollars.
 - Subsequent investment is in marketing which is in the 2 to 3 million dollar range.

- Capital risk is relatively high.

C. Non-cost competitive advantage

- Application knowledge is key competitive advantage.
 - Most key players acquire application knowledge through related businesses.
 - Once established, more knowledge is derived from customer base and relationships.
- Largest vendors also provide the hardware platforms which is a significant competitive advantage. This is particularly significant in microcomputers and to a lesser extent in minicomputers.
- Processing services companies have the advantage of developing and testing their products with their service customers prior to release as a software product.
- Banks selling software have an advantage in application knowledge.
- Mainframe manufacturers have special and unique access to customers through their relationship as provider of the hardware platform.
- Fear selling is common in the industry.
- Customer loyalty is significant due to investment in training and conversion cost.

D. Expected Retaliation

- Established vendors will react relatively complacently to new competitors.
- The only exception would be if a key player were to acquire another key player.
- This is an industry where new products are being introduced constantly and where old products are completely renovated every three or four years. The competitors are used to change.

4. Bargaining power of suppliers

- Programmers have always been a scarce and dear resource and command relatively high salaries.
- Key talent is very important to the success of products.
- Employers keep top-talent through stock option plans, excellent working conditions, and high salaries.
- Acquired companies usually lose key people very rapidly because the opportunities for a big score through stock options is greatly diminished. Also, many key talented people will become rich through the acquisition and either retire or start a competitive company with their new infusion of capital.

**DISTRIBUTION
APPLICATION SOFTWARE SECTOR: MAINFRAME**

I. Key Players

American Software (Atlanta, GA); Distribution Requirements Planning; IBM/HIS/Burroughs/Sperry/NCR;
\$29 million total-Distribution = \$4 million
Arthur Andersen & Co. (Chicago); Distribution Control System; IBM only; \$25 million
Cambar Business Systems (Charleston, SC); Control; IBM only
\$4 million
Compumatics (Ft. Wayne, IN); Burroughs; \$2 million
Computer Business Applications, Inc. (Montrose, CA);
Cullinet (Westwood, MA) (NYSE); \$10 million
IBM Corporation (Armonk, NY); Distribution Purchasing Management System; IBM only; \$150 million
MSA (Atlanta, GA); Distribution Resource Planning System;
IBM only; \$8-\$10 million
Smyth Business Systems (Canton, OH); SI/100 and SI/300; IBM
only; \$3 million
World Wide Chain Store Systems Ltd. (Chicago, IL); product
name unknown; \$5 million
Xerox Computer Services; Los Angeles; Xerox Distribution
System for IBM Computers; IBM; \$30 million

A. Revenue

- o Listed Above

B. Profit

American SW (18% overall)
Cullinet (negative 6.7% overall)
MSA (11.1% overall)

- o Large diversified software firms selling mainframe software are generally profitable in distribution applications.
- o In general, smaller privately held firms are profitable.

C. Return on Equity (Net Income/Equity)

American SW - 17%
Cullinet - negative 23.1%
MSA - 12%

- o Distribution application software vendors, whether privately held or publicly traded, have an average to above-average return on equity.

D. Key Products

- o The leading products are integrated, full function software packages designed specifically for the distribution business, generally running on IBM mainframes, IBM small systems, H-P or DEC minicomputers, or IBM personal computers.

E. Market Share

- o Non hardware market share leaders include:
 - Xerox Computer Systems
 - Arthur Andersen
 - Cullinet
- o Market leaders sell accounting systems or have an accounting-based relationship with the customer.

F. Ratio: Market to Book Value

- o American Software: \$121.5/\$ 50.0 million = 2.43
- o Cullinet: \$197.1/\$119.3 million = 1.65
- o MSA: \$172.4/\$151.9 million = 1.14

II. Competitive Issues

A. Sector Characteristics

1. User Expenditures - 1987

- o User expenditures for mainframe distribution software were \$265 million, the fourth highest among 14 vertical markets, owing to the large base of installed mainframes.

2. Forecast - 1987-1992 Growth

a. Overall market

- o INPUT expects distribution-oriented software to increase at a 21% annual rate, compared to an average annual rate of 19% for all vertical markets.

b. By hardware platform

- o Spending for mainframe-based application software will increase 25% annually through 1992, reflecting the need for increased computerization in the distribution industry.

3. Profitability

a. By industry sector (hi/medium/lo ranges)

- o The distribution portion of mainframe software suppliers' business is generally profitable. Privately-held companies are in the medium- to high- profit area.

b. By key player (based on aftertax profit)

B. Fixed Cost

1. Primary Activity

- o Mainframe software developers must have access to a mainframe computer, either in-house or through a timesharing service, to work on the product. Offices, copiers, and (ideally) desktop publishing capabilities are necessary fixed costs.

- Inbound logistics:	4%
- Operations:	5%
- Outbound logistics:	1%
- Marketing and Sales:	25%
- Service:	20%
- Margin:	15%

2. Secondary Activity

- Firm infrastructure: 10 %
- Human Resource Mgmt: 3%
- Technology Development: 12%
- Procurement: 5%

C. Cyclical Supply/Demand

- o Historical: No periods of unmatched supply/demand
- o Current: No unbalanced supply/demand cycle
- o Characteristics: Largest customers are identified, long sales cycle, & "stable" industry.

D. Product Differentiation

- o No de facto standards for software; strong preference for IBM mainframes and, to a lesser extent, NCR mainframes
- o Bases for differentiation: Price; post-sales support (documentation; tech support; product updates) account references

E. Market Fragmentation/Concentration

- o Competitor/Buyer ratio: 1:50
- o Market Characteristics: Less than 50 competitors
- o Market Concentration: Top 5 non-hardware vendors have 35% of market

F. Competitive Dynamics

- o Similar styles and products since distribution requirements are relatively standard. APICS and Council for Logistics Management establish standards, which are largely adhered to by industry participants
- o Evolution: Integrate with accounting

G. Corporate Stakes

- o This is very important to the success of the participants, although acknowledged only recently. Automation is a "make or break" factor in wholesale distribution and represents important opportunities for operating efficiencies in retail distribution.

H. Exit Barriers

- o Retailing and wholesaling is a "win/lose" business, with strong emotional needs to win. Leaving is like losing.
- o Customers' software support contracts are the main impediment to application software suppliers exiting.

III. Entry Barriers

A. Learning Curve/Economies of Scale

- o Older firms are generally more profitable in mainframe-based distribution software -- better product definition; better support; focused sales and marketing efforts; better implementation of newer technologies

B. Capital Requirements

- o Based on the need for direct sales (vs. selling through reps or using licensing agreements) plus the capital required for development personnel, equipment access; and office space, capital requirements are high.

C. Competitive Advantages (Other Than Cost)

- o Direct sales force; contacts within customer base
- o Industry market "presence"
- o Reference sales/customer loyalty
- o Understanding the distribution business
- o Software which works (!) and can be sold in modules
- o Support (technical support; documentation; new releases)

D. Retaliation Toward New Competitors

- o If large, well-funded acquirer/competitor: Lower prices; introduce new product feature(s); solidify relationship with client senior management; develop linkages with industry associations; more market presence through increased article placement/trade show attendance; increased competitive analysis
- o If smaller, new entrant: Lower prices; increased competitive analysis and knock-offs

IV. Supplier Bargaining Power

- Systems analysts/programmers are important in application software
- Sales force and technical support/marketing personnel are crucial to success.
- To keep 'em: Locate in Sun Belt or represent a unique business opportunity in Rust Belt; offer all employees stock incentives; offer the chance of promotions through company growth

**DISTRIBUTION
APPLICATION SOFTWARE SECTOR: MINICOMPUTERS**

I. Key Players

American Software (Atlanta, GA); Distribution Requirements Planning; H-P/Wang/ IBM System/38; (CAMS-\$29 million-relevant portion is \$4 million)

Bakco Data (Deerfield, IL); Comprehensive Wholesale Distribution System; H-P; \$2 million

Compucon (Dallas, TX); CAPE System; DEC; \$8 million

GSI Transcomm (Pittsburgh, PA); TOLAS; DEC VAX; \$2 million

Hewlett-Packard Co. (Palo Alto, CA); SFD/3000; H-P 3000; \$30 million

IBM Corporation (Armonk, NY); various packages for S/38; \$55 million

National Distributor Systems (Stratford, CT); \$2 million

Southware Innovation (Auburn, AL); Inventory/Sales; UNIX- and Xenix-based; \$1.5 million

The System House (Clifton, NJ); Master Distributor System; PICK-based; \$3.5 million

3PM (Sub. McKesson Co in San Francisco; Livonia, MI); Pharmacy/Florist Management; DEC-based; \$20 million

Xerox Computer Services; Los Angeles; Xerox Distribution System for DEC Computers; DEC; \$15 million

A. Revenue

- o See above listing

B. Profit

- o American Software (18% overall)
- o Large diversified software firms selling minicomputer software are generally profitable in distribution applications.
- o In general, smaller privately held firms are profitable.

C. Return on Equity (Net Income/Equity)

- o American SW - 17%
- o Distribution application software vendors, whether privately held or publicly traded, have an average to above-average return on equity.

D. Key Products

- o The leading products are integrated, full function software packages designed specifically for the distribution business, generally running on H-P or DEC minicomputers,

E. Market Share

- o Non hardware market share leaders include:
 - 3PM (Pharmacy/Florist)
 - Xerox Computer Services
 - Compucon
- o IBM and H-P have a solid distribution market presence
- o Market leaders sell turnkey systems or application software.

II. Competitive Issues

A. Sector Characteristics

1. User Expenditures - 1987

- o User expenditures for minicomputer distribution software were \$98 million, the fifth highest among 14 vertical markets, owing to the rapid installation of minicomputers to support distributed processing.

2. Forecast - 1987-1992 Growth

- a. Overall market

- o INPUT expects distribution-oriented software to increase at a 21% annual rate, compared to an average annual rate of 19% for all vertical markets.

b. By hardware platform

- o Spending for minicomputer-based application software will increase 19% annually through 1992, reflecting the need for increased computerization in the distribution industry.

3. Profitability

- a. By industry sector (hi/medium/lo ranges)

- o The distribution portion of minicomputer software suppliers' business is generally profitable. Privately-held companies are in the medium- to high-profit area.

b. By key player (based on aftertax profit)

- o The distribution portions of American Software and Xerox Computer Services are profitable.

B. Fixed Cost

1. Primary Activity

- o Minicomputer software developers must have access to a minicomputer, either in-house or through a timesharing service, to work on the product. Offices, copiers, and (ideally) desktop publishing capabilities are necessary fixed costs. Relatively expensive.

- Inbound logistics:	4%
- Operations:	5%
- Outbound logistics:	1%
- Marketing and Sales:	30%
- Service:	20%
- Margin:	4%

2. Secondary Activity

- Firm infrastructure:	13 %
- Human Resource Mgmt:	4%
- Technology Development:	14%
- Procurement:	5%

C. Cyclical Supply/Demand

- o Historical: No periods of unmatched supply/demand
- o Current: No unbalanced supply/demand cycle
- o Characteristics: Largest customers are identified, long sales cycle, & "stable" industry.

D. Product Differentiation

- o No de facto standards for software; user preference for DEC and H-P and, to a lesser extent, IBM minicomputers
- o Bases for differentiation: Price; post-sales support (documentation; tech support; product updates); account references; incorporating newer technologies into products

E. Market Fragmentation/Concentration

- o Competitor/Buyer ratio: 1:40
- o Market Characteristics: Less than 50 competitors
- o Market Concentration: Top 5 non-hardware vendors have 45% of market

F. Competitive Dynamics

- o Similar styles and products since distribution requirements are relatively standard. APICS and Council for Logistics Management establish logistics standards, which are largely adhered to by industry participants
- o Evolution: Integrate with accounting and management reporting, frequently part of a turnkey system

G. Corporate Stakes

- o This is very important to the success of the participants, although acknowledged only recently. Automation is a "make or break" factor in wholesale distribution and represents major opportunities to reduce expenditures in retail distribution.

H. Exit Barriers

- o Retailing and wholesaling is a "win/lose" business, with strong emotional needs to win. Leaving is like losing.
- o Customers' software support contracts are the main impediment to application software suppliers leaving.

III. Entry Barriers

A. Learning Curve/Economies of Scale

- o Older firms are generally more profitable in minicomputer based distribution software -- better product definition; better support; focused sales and marketing efforts; better implementation of new technologies

B. Capital Requirements

- o Based on the need for direct sales (vs. selling through reps or using licensing agreements) plus the capital required for development personnel, equipment access; and office space, capital requirements are high.

C. Competitive Advantages (Other Than Cost)

- o Direct sales force; contacts within customer base
- o Industry market "presence"
- o Reference sales/customer loyalty
- o Understanding the distribution business
- o Software which works (!) and can be sold in modules
- o Support (technical support; documentation; new releases)

D. Retaliation Toward New Competitors

- o If large, well-funded acquirer/competitor: Lower prices; introduce new product feature(s); solidify relationship with client senior management; develop linkages with industry associations; more market presence through increased article placement/trade show attendance; increased competitive analysis
- o If smaller, new entrant: Lower prices; increased competitive analysis.

IV. Supplier Bargaining Power

- o Systems analysts/programmers are important in application software
- o Sales force and technical support/marketing personnel are crucial to success.
- o To keep 'em: Locate in Sun Belt or represent a unique business opportunity in Rust Belt; offer all employees stock incentives; the chance of promotions thru company growth

**DISTRIBUTION
APPLICATION SOFTWARE SECTOR: MICROCOMPUTERS**

I. Key Players

Compute-RX (Richmond, VA); Pharmacy Management; IBM PC;
\$9 million
Medi-Span (Indianapolis, IN); Pharmacy; IBM PC; \$5.5 million
Realworld Corporation (Chichester, NH); Inventory
Control/OE/Billing; IBM PC; \$8.5 million
World Wide Chain Store Systems Ltd. (Chicago, IL); ??
product name; \$5 million

Others:

ADS Software (Roanoke, VA); ADS Retail Florists Package; IBM
small systems; \$1.5 million
Contract Systems (Wakefield, MA); Retail management system;
IBM small systems; \$1.5 million
Data Universal (Teaneck, NJ); RIVA-xxxx; IBM small systems;
\$1.7 million
Distribution Management Systems Company (Rocky Mountain,
NC); Counter/Connection; IBM PC; \$2 million
DSI/Medicom (Overland Park, KS); Medicom Rx; IBM PC;
\$4 million
Franklin Business Systems (Livingston, NJ); TRIM; IBM PC;
\$1.5 million
Systematics Data Marketing (Jericho, NY); Retail Inventory;
IBM small systems; \$2.0 million
TracLine Software (Hicksville, NY); Distributing; IBM PC;
\$1.0 million
XtraSoft (Santa Clara, CA); Storeminder; IBM PC; \$2 million

A. Revenue

- o See above

B. Profit

- o Firms selling microcomputer-based software are generally
profitable in distribution applications.

C. Return on Equity (Net Income/Equity)

- o Distribution application software vendors, whether
privately held or publicly traded, have an average to above-
average return on equity.

D. Key Products

- o The leading products are relatively full function software packages designed specifically for the distribution business, generally running on IBM personal computers. Program limitations are the number of records supported.

E. Market Share

- o Non hardware market share leaders include:
 - Compute-RX
 - Medi-Span
 - RealWorld Corporation
 - World Wide Chain Store Systems, Ltd.
- o Market leaders sell microcomputer-based systems into targeted retail businesses.

II. Competitive Issues

A. Sector Characteristics

1. User Expenditures - 1987

- o User expenditures for microcomputer distribution software were \$162 million, the third highest among 14 vertical markets, owing to the growth opportunities for PC-based systems in small retail and wholesale businesses.

2. Forecast - 1987-1992 Growth

a. Overall market

- o INPUT expects application software to increase at a 25% annual rate between 1987 and 1992.

b. By hardware platform

- o Spending for microcomputer-based application software will increase 31% annually through 1992, reflecting the need for increased computerization in the distribution industry.

3. Profitability

a. By industry sector (hi/medium/lo ranges)

- o Microcomputer software vendors serving the distribution business are generally profitable. Privately-held companies are in the medium- to high- profit area.
 - b. By key player (based on aftertax profit)
- o All leaders are privately held. INPUT believes each is profitable.

B. Fixed Cost

1. Primary Activity

- o Microcomputer software developers must have access to a microcomputer to work on the product. Very low entry cost since this market could be supported from one's home.
- Inbound logistics: 8%
- Operations: 10%
- Outbound logistics: 2%
- Marketing and Sales: 25%
- Service: 15%
- Margin: 10%

2. Secondary Activity

- Firm infrastructure: 15 %
- Human Resource Mgmt: 4%
- Technology Development: 5%
- Procurement: 6%

C. Cyclical Supply/Demand

- o Historical: Initially, demand exceeded supply since small stores had to be educated about the advantages of such purchases
- o Current: Supply slightly exceeds supply due to product cycles; new microcomputers (PS/2); some integration of accounting and distribution systems
- o Characteristics: Large potential market; retail/wholesale industry niche specialization helps ensure vendor success

D. Product Differentiation

- De facto standard for software are IBM PC and PS/2 and, to a lesser extent, Apple Macintosh
- Bases for differentiation: Price; post-sales support (documentation; tech support; product updates); account references;

E. Market Fragmentation/Concentration

- Competitor/Buyer ratio: 1:500
- Market Characteristics: 75-150 competitors
- Market Concentration: Top 5 non-hardware vendors have 8-10% of market

F. Competitive Dynamics

- Similar styles and products since distribution requirements are relatively standard. APICS and Council for Logistics Management establish standards, which are largely adhered to by industry participants
- Evolution: Integration with accounting and management reporting software

G. Corporate Stakes

- This area is very important to the success of retailers & wholesalers, although acknowledged only recently. Automation is a "make or break" factor in wholesale distribution and represents important opportunities for operating efficiencies in retail distribution.

H. Exit Barriers

- Retailing and wholesaling is a "win/lose" business, with strong emotional needs to win. Leaving is like losing.
- Customers' software support contracts are the main impediment to application software suppliers leaving.

III. Entry Barriers

A. Learning Curve/Economies of Scale

- o No clear trend in the microcomputer based distribution software business -- any newcomer can offer better product definition; better support; focused sales and marketing efforts

B. Capital Requirements

- o Capital requirements are low since much work can be done as an after-hours job on available equipment. Marketing and sales dollar requirements differentiate the serious players from the dilettantes.

C. Competitive Advantages (Other Than Cost)

- o Direct sales force; contacts within customer base
- o Industry market "presence"
- o Reference sales/customer loyalty
- o Understanding the distribution business
- o Software which integrates with accounting/management reporting applications
- o Support (technical support; documentation; new releases)

D. Retaliation Toward New Competitors

- o If large, well-funded acquirer/competitor: Lower prices; introduce new product feature(s); solidify relationship with client senior management; develop linkages with industry associations; more market presence through increased article placement/trade show attendance; increased competitive analysis
- o If smaller, new entrant: Lower prices; increased competitive analysis.

IV. Supplier Bargaining Power

- o Systems analysts/programmers are important in application software
- o Sales force and technical support/marketing personnel are crucial to company success.
- o To keep 'em: Locate in Sun Belt or represent a unique business opportunity in Rust Belt; offer all employees stock incentives; the chance of promotions thru company growth; strong incentives for the sales force

INSURANCE SECTOR

INTRODUCTION: MAINFRAME VENDORS ARE DOMINANT, SO MOST QUERIES ARE ANSWERED FOR MAINFRAMES, WITH MINIS AND MICROS INCLUDED, EXCEPT WHERE OTHERWISE NOTED. ONLY THREE PUBLICLY-HELD VENDORS ARE INCLUDED, SO FINANCIAL PROFILES ARE SUSPECT.

1. KEY PLAYERS

VENDOR	PLTFRM	TOTAL SW REV (\$M)	CORPORATE STAKE	MKT SHR	OWNER-SHIP
EDS	MAIN	70	MEDIUM	15%	DIV
POLICY MGMT	MAIN	67	TOTAL	14	PUB
ASA	MAIN	47	TOTAL	10	PRI
CONTINUUM	MAIN	17	TOTAL	4	PUB
ISI SYST	MINI/PC	13	TOTAL	3	PRI
CYBERTEK	MAIN	14	TOTAL	3	PUB
PALLM	MAIN	12	TOTAL	3	PRI
CAPSCO	MAIN/MI	6	TOTAL	2	PRI

NOT INCLUDED IN THIS ANALYSIS ARE SEVERAL TURNKEY SYSTEMS VENDORS WHO DELIVER PRIMARY ADDED VALUE IN SOFTWARE. THEY ARE:

ARC/AMS \$30 MILLION
REDSHAW \$40 "
AGENA \$14 "
INSURENET \$27 "

KEY PLAYERS SOFTWARE PRODUCTS:

EDS: CLAIMS PROCESSING & ADMIN SOFTWARE FOR VERY LARGE INS. COMPANIES.

POLICY MGMT: IBM-COMPATIBLE PROPERTY/ CASUALTY MANAGEMENT PROGRAMS.

ADVANCED SYSTEMS APPLICATIONS (ASA): IBM-BASED HEALTH INS CLAIMS & ADMIN. SOFTWARE.

CONTINUUM COMPANY: CLIENT CONTRACT ADMIN PROGRAMS FOR HEALTH & LIFE INS.

ISI SYSTEMS: INSURANCE RATING/QUOTING SOFTWARE FOR PROPERTY/CASUALTY FIRMS, ON IBM MAINFRAMES.

CYBERTEK: LIFE INS. SOFTWARE ONLY

PALLM: LIFE, HEALTH, AND PROPERTY SOFTWARE.

CAPSCO: LIFE INS. SOFTWARE ON IBM MAINFRAMES.

INPUT'S PROFILES ON THESE VENDORS ARE ATTACHED, PROVIDING FURTHER INFORMATION ABOUT THEIR MARKETS, PRODUCTS AND OPERATIONS.

2. COMPETITIVE RIVALRY

A. SECTOR CHARACTERISTICS

- USER EXPENDITURES: 1987 MAINFRAME SOFTWARE: \$251 MILLION
MINICOMPUTER " 84 "
MICROCOMPUTER " 147 "
TOTAL REVENUES 482 "
- GROWTH RATES, 1987-1992: MAINFRAME: 14%
MINICOMPUTER: 18%
MICROCOMPUTERS: 24%
- PROFITABILITY: THERE ARE ONLY THREE PUBLIC COMPANIES IN THIS SECTOR THAT ARE SIGNIFICANT. CONTINUUM WAS NOT PROFITABLE IN FY86, AND SHOULD NOT BE INCLUDED. OTHERS ARE SHOWN BELOW.

	POLICY MGMT	CYBERTEK
TOT REVENUE (\$M)	154M	25M
ATP (\$M)	(4M)	2M
ROE %	---	15%
SHRS OUT (M)	16M	3.6M
PRICE PER SHRE	25	2.8
MARKET VALUE (\$M)	400M	10.5
BOOK VALUE (\$M)	125M	12.0
MARKET TO BOOK	3.2	0.8

B. FIXED COSTS(AVERAGE OF THREE VENDORS)

INFRASTRUCTURE, FIN/ADMIN	9%
TECH DEVELOPMENT	29%
OPERATIONS AND LOGISTICS	35%
MARKETING AND SALES	22%

MARGIN	5%
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C. CYCLICAL SUPPLY/DEMAND

DEMAND IS DRIVEN BY ECONOMIC INFLUENCES ON INSURANCE COMPANIES' ABILITY TO RAISE AND MAINTAIN HIGHER PREMIUM PRICES. INTRODUCTION OF NEW SOFTWARE PRODUCTS ALSO FEEDS DEMAND, BUT THIS SECTOR WAS ONE OF THE FIRST TO EMBRACE LARGE MAINFRAMES, HAS QUITE A BIT OF OBSOLESCENT SOFTWARE, YET IS SLOW TO CHANGE.

D. PRODUCT DIFFERENTIATION: HAVING SOFTWARE COMPATIBLE WITH IBM MAINFRAMES AND MINIS IS VITAL. VENDORS SELECT NICHES (HEALTH, LIFE, PROPERTY/CASUALTY, RATING, AGENCIES) AND TRY TO PENETRATE, BASED ON INDUSTRY EXPERTISE, CUSTOMER REFERRALS AND REFERENCES, PRODUCT FEATURES. NETWORKING AND INTEGRATION OF SEPARATE

APPLICATION MODULES ARE NEWER AREAS FOR DIFFERENTIATION.

IN MINICOMPUTER AREA, BEING ESTABLISHED ON IBM, DEC, HP IS A DIFFERENTIAL.

E. MARKET FRAGMENTATION:

TOP NINE VENDORS HAVE 54% OF SOFTWARE MARKET, SO BECOMING TRULY SUCCESSFUL WILL BE DIFFICULT FOR NEWCOMER, ESPECIALLY IN HEAVILY PENETRATED MAINFRAME SOFTWARE. MORE ROOM EXISTS IN MINIS, AND MUCH MORE FOR PC SOFTWARE USED IN AGENCIES, NETWORKED TO LARGE SYSTEMS IN INSURANCE FIRMS.

F. COMPETITIVE DYNAMICS:

COOPERATION IS OCCURRING IN ONE AREA, SETTING OF EDI STANDARDS FOR EXCHANGE OF DATA BETWEEN INSURERS AND AGENCIES, USING IBM'S INFORMATION NETWORK. OTHERWISE, COMPETITION IS FIERCE, WITH NO COOPERATION.

MARKET SHARES CHANGE SLOWLY IN MAINFRAMES, BUT MORE FLUID IN MINIS, WIDE OPEN IN EMERGING MICRO MARKET. ALL MAINFRAME AND MINI SOFTWARE VENDORS ARE INTRODUCING MICRO-BASED PRODUCTS IN ATTEMPT TO CAPTURE THIS MARKET.

POLICY MANAGEMENT SYSTEMS IS DOMINANT PROPERTY/CASUALTY VENDOR, AND EDS IS LEADER IN HEALTH.

G. CORPORATE STAKES: AS SHOWN IN SECTION 1, ALL PLAYERS EXCEPT EDS ARE TOTALLY COMMITTED TO THIS SECTOR, AND EDS IS UNLIKELY TO WITHDRAW, DUE TO ITS STRONG PRESENCE.

H. EXIT BARRIERS: EMOTIONAL COMMITMENTS AND VERY LARGE SOFTWARE

INPUT

AND HARDWARE INVESTMENTS WILL BE BARRIERS TO EXIT, IN ADDITION TO TOTAL COMMITMENT TO INDUSTRY BY NEARLY ALL PLAYERS.

3. ENTRY BARRIERS

A. ECONOMIES OF SCALE: MAINFRAME SOFTWARE NEEDS ECONOMIES OF SCALE TO BE PROFITABLE, AND LONGEVITY HELPS, AS REPUTATIONS AND SUPPORT REVENUES GROW OVER TIME. MINIS REQUIRE LESS TIME AND SCALE, MICROS ALMOST NONE AT ALL.

B. CAPITAL REQUIREMENTS. EXISTING PLAYERS HAVE SUBSTANTIAL ASSETS AVAILABLE. NEW ENTRANTS FOR MAINFRAME ARENA NEED \$10 MILLION OR MORE TO ENTER, MINIS \$5 MILLION, MICROS MUCH LESS DUE TO SPEED AND COST OF DEVELOPMENT, PLUS ABILITY TO SELECT LESS EXPENSIVE DISTRIBUTION AND SUPPORT CHANNELS.

C. COMPETITIVE ADVANTAGE (NON-COST): TECHNICAL DEVELOPMENT AND DESIGN SKILLS, INDUSTRY KNOWLEDGE, MARKET PRESENCE AND POSITION, FULL-LINE SOFTWARE AVAILABLE, CUSTOMER REFERENCES. NEW OR OLD ENTRANTS WILL BE STRESSING PRODUCT INTEGRATION AND CONNECTIVITY VIA NETWORKS.

D. EXPECTED RETALIATION: NOTHING UNUSUAL, UNLESS TWO EXISTING PLAYERS MERGE.

4. SUPPLIER BARGAINING POWER: AS IN ALL SECTORS, KEY DEVELOPMENT STAFF HAVE GREAT LEVERAGE UNTIL PRODUCT IS MATURE. FIRMS PROTECT THESE EMPLOYEES WITH STOCK OPTIONS, HIGH SALARIES, ENRICHED JOB ASSIGNMENTS. IN ACQUISITIONS, KEY PLAYERS OFTEN DO LEAVE WHEN EQUITY IS NO LONGER AVAILABLE, OR THEY HAVE CASHED IT IN.

MEDICAL SECTOR

1. KEY PLAYERS

VENDOR	SECTOR	SOFTWARE	PROFIT	ROE%	MARKET/	MKT	OWNER-
						SHR	SHIP
REV (\$)	%	BOOK					
SHARED MED.	MAIN/MI	20	32	15	2.9	3	PUB
BAXTER TRAV	MAIN/MI	18	--	--	---	6	DIV
TECHNICON	MAIN	30	--	--	---	5	DIV
MCDONNELL	MAIN	17	--	--	---	3	DIV
HBO & CO	MINI	11	(3)	--	2.8	2	PUB
SYST. ASSOC	MINI	20	--	--	---	3	DIV
MEDITECH	MINI	25	--	--	---	4	PRI
HLTH DATA	MINI	5	--	--	---	1	PRI

NOTE: MOST OF THESE VENDORS, AND MANY OTHERS, HAVE INTRODUCED MICRO-BASED PRODUCTS RECENTLY, BUT THAT MARKET IS VERY FRAGMENTED, AND NO CLEAR LEADERS HAVE EMERGED.

KEY PLAYERS' SOFTWARE PRODUCTS:

SHARED MEDICAL SYSTEMS: COMPLETE INTEGRATED HOSPITAL INFORMATION SYSTEM (HIS) ON IBM SYSTEMS, INCLUDING PATIENT CARE, FINANCIALS, ADMIN AND DECISION SUPPORT SYSTEMS. ALSO PC PRODUCTS FOR DOCTORS AND CLINICS.

BAXTER TRAVENOL: LARGE HOSPITAL HIS ON IBM MAINFRAMES, SMALLER SYSTEMS ON IBM 36/38.

MCDONNELL-DOUGLAS HISC: SOFTWARE & TURNKEY FOR HOSPITALS. INCLUDING REMOTE DELIVERY SERVICES, 1500 HOSPITALS, OR 21% PENETRATION.

HBO & CO: MINI-BASED PATIENT INFO SYSTEMS, IN 1200 MEDIUM AND SMALL SIZED HOSPITALS.

SYSTEMS ASSOCIATES: HIS FOR MINI-BASED HOSPITALS AND HOSPITAL-DOCTOR NETWORKS.

MEDITECH: INTEGRATED OR STAND ALONE APPLICATIONS FOR CLINICAL AND FINANCIAL USE.

HEALTH DATA SCIENCES: HIS ON IBM 43XX.

2. COMPETITIVE RIVALRY

A. SECTOR CHARACTERISTICS

B. FIXED COSTS (AVERAGE OF FOUR VENDORS)

INFRASTRUCTURE, FIN/ADMIN	16%
TECH D'EVELOPMENT	10%
OPERATIONS AND LOGISTICS	38%
MARKETING, SALES & SERVICE	26%
MARGIN	10%

-USER EXPENDITURES, 1987: MAINFRAME SOFTWARE: \$300 MILLION
MINICOMPUTER " \$186 "

MICROCOMPUTER " \$108 "
TOTAL SOFTWARE: \$594 "

-GROWTH RATES, 1987-1992 AAGR: MAINFRAME=14%
MINICOMPUTER=20%
MICROCOMPUTER=23%

-PROFITABILITY: ONLY 3 PUBLICLY HELD PURE SOFTWARE COMPANIES ARE LARGE ENOUGH TO BE SIGNIFICANT, AND TWO WERE UNPROFITABLE! THE LEADING VENDORS DELIVER VIA MULTIPLE DELIVERY MODES, INCLUDING REMOTE SERVICES AND TURNKEY SYSTEMS.

-FIXED COSTS: HBO HAS \$122 M IN ASSETS FOR CLIENT COMPUTER USE

C. CYCLICAL SUPPLY/DEMAND IS DRIVEN BY GOVERNMENT-IMPOSED PAYMENT LIMITS(DRG), PRODUCING PRESSURE TO CONTROL COSTS IN ALL HOSPITALS, AND USE INFO SYSTEMS AS COMPETITIVE TOOLS. THIS WILL CONTINUE TO DRIVE DEMAND IN ALL THREE EQUIPMENT SECTORS FOR THE NEXT FIVE YEARS AT LEAST.

MAINFRAME SUPPLY: A NUMBER OF LARGE, WELL-ENTRENCHED VENDORS PRODUCE STRONG SUPPLY TO A MARKET THAT IS NEAR SATURATION AT THE TOP END.

MINI SUPPLY: COST ADVANTAGE OF MINI HAS ENTICED MOST SUPPLIERS INTO THIS MARKET, MOVING DOWN FROM MAINFRAMES. SUPPLY IS PLENTIFUL, BUT MARKET IS LESS SATURATED.

MICRO: WIDE OPEN, WITH HIGH DEMAND FOR DEPARTMENTAL SYSTEMS AND NETWORKED WORKSTATIONS.

D. PRODUCT DIFFERENTIATION:

MAINFRAME: IBM COMPATIBILITY IS KEY. NICHES EXIST, AS VENDORS ADDRESS LARGE OR MEDIUM-SIZED HOSPITALS OR DEPTS. DEGREE OF INTEGRATION, QUALITY OF SERVICE, REPUTATION ARE ALL IMPORTANT. SOFTWARE FEATURE-BY-FEATURE COMPARISONS LESS CRUCIAL. FUTURE INTEGRATION OF DATA AND PATIENT DIAGNOSTIC GRAPHICS WILL BE A BIG PLUS.

MINI:EQUIPMENT PLATFORM IS IMPORTANT, AS VENDORS STRIVE TO LEVERAGE OFF IBM, DEC, HP SALES FORCES, SUPPORT AND REPUTATION. PRICE COMPETITION IS STRONG, BUT CAN BE OVERCOME BY REFERENCES, REPUTATION, FULL-LINE SOFTWARE.

MICRO:PRICE COMPETITION IS SEVERE. SELECTION OF NARROW NICHES, NETWORKING, DISTRIBUTION PARTNERS IS IMPORTANT.

E. MARKET FRAGMENTATION:

MAINFRAME: LESS THAN 1000 HOSPITALS CAN JUSTIFY, 25-30 VENDORS OFFERING SOLUTIONS. TOP TEN VENDORS HAVE 33% OF MARKET, SO SMALLER PLAYERS MAY BE SHAKEN OUT.

MINI:BIGGER MARKET, 3000 OR MORE HOSPITALS, HUNDREDS OF MEDICAL GROUPS PURSUED BY OVER 200 VENDORS. BIG SHAKEOUT WILL OCCUR SOON.

MICRO: ALL HOSPITALS AND MEDICAL GROUPS CAN USE PC-ORIENTED DEPARTMENTAL SYSTEMS OR NETWORKS. MAJOR OPPORTUNITY, BUT OVER 1500 VENDORS HAVE PRODUCTS! LONG SALES CYCLES AND PRICE COMPETITION WILL ELIMINATE MANY.

F. COMPETITIVE DYNAMICS:COMPETITION IS FIERCE IN ALL SEGMENTS, WITH LITTLE COOPERATION. AFFILIATIONS WITH CROSS-INDUSTRY SOFTWARE SUPPLIERS LIKE MSA AND GLOBAL SOFTWARE DO OCCUR. MARKET SHARE CHANGES SLOWLY IN MAINFRAMES, MORE RAPIDLY IN MINIS, UP FOR GRABS IN MICROS.

G. CORPORATE STAKES:COMPANIES LIKE TECHNICON, SMS, HBO, MEDITECH, HEALTH DATA SCIENCES, ICC AFFILIATES, SYSTEM ASSOC. CANNOT EXIT, BEING TOTALLY DEDICATED. IBM, MCDONNELL, BAXTER TRAVENOL HAVE LESS TO LOSE AND COULD EXIT WITH SOME PAIN AND DISRUPTION.

H. EXIT BARRIERS:

MAINFRAME: NON-RECOVERABLE INVESTMENTS, LOSS OF PRESTIGE, LAWSUITS FOR CONTINUING SUPPORT OR BROKEN PROMISES, IMPLIED THREATS TO PUBLIC HEALTH AT GIVEN HOSPITALS, WILL PREVENT EXITS IN THIS SECTOR BY MAJOR PLAYERS.

MINI; SAME AS ABOVE, EXCEPT ASSETS INVOLVED ARE SMALLER, SO EXIT LESS PAINFUL.

MICRO: EARLY STAGE MARKET, EXIT NO PROBLEM.

3. ENTRY BARRIERS

INPUT

A. LEARNING CURVE/ECONOMY OF SCALE: DIRECT PROPORTION TO SIZE OF PLATFORM; MAINFRAMES, SCALE IS VERY IMPORTANT, MINIS LESS SO, MACROS NOT VERY. LEARNING CURVE VARIES WITH COMPLEXITY OF SOFTWARE DELIVERED, ALSO.

B. CAPITAL REQUIREMENTS:

MAINFRAME: \$10 MILLION OR MORE TO ENTER, WITH HIGH RISK OF FAILURE IN A STABILIZED MARKET.

MINIS: ENTRY FOR \$3-5 MILLION, STILL REASONABLE CHANCE OF SUCCESS.

MACROS: EASY TO WRITE PROGRAMS, FIND DISTRIBUTOR, BUT DIFFICULT TO BUILD AND SUPPORT SIZEABLE CUSTOMER BASE.

C. COMPETITIVE ADVANTAGE(NON-COST)

EXPERTISE IN INDUSTRY, AND DEVELOPMENT SKILLS ARE CRITICAL. RELATIONSHIPS WITH EQUIPMENT VENDORS ARE MAJOR STRENGTH. VENDOR REPUTATION IN USER COMMUNITY, AND SOLID REFERENCE BASES, ARE HARD TO GET, HARDER TO OVERCOME IF THEY DON'T EXIST. IN MICROS, LACK OF AN EFFECTIVE DISTRIBUTION CHANNEL IS FATAL.

D. RETALIATION TOWARD NEW ENTRANT: NEW ENTRANTS MOST VULNERABLE WHEN DISTRIBUTION CHANNELS CAN BE DENIED, PRICING PRESSURE EXERTED BY EXISTING VENDORS, PRODUCT FEATURES CAN BE COMPARED WITH LESS EXTENSIVE PRODUCTS.

4. SUPPLIER BARGAINING POWER: SYSTEM DESIGNERS AND PROGRAMMERS EXERT CONSIDERABLE LEVERAGE. RETENTION CAN BE ENHANCED BY STOCK OPTIONS, RECOGNITION PROGRAMS, ENRICHED TECHNICAL ASSIGNMENTS. UNTIL PRODUCT IS MATURE, THIS TALENT IS ESSENTIAL. ATTRITION OFTEN FOLLOWS ACQUISITION, WHEN "CULTURE" CHANGES.

SECTOR: DATABASE MANAGEMENT SYSTEM VENDORS

1. KEY PLAYERS

		Channel	1987 Revenue	Profitability DBMS %	Key Products Roe.	Mkt. Share (%)
<u>MAINFRAME</u>	IBM		--	-- --	DB2	
ADR (Ameritech)	Dir/OEM	15	80	1984-16%	IMS	11%
CULLINET (Public)	Dir/OEM	75		1987- break-even	Datacom/DB	
CINCOM (Private)	Direct	75	n/a	Loss 1986 9%	IDMS/R	15%
SOFTWARE AG (Pub)	Direct	55	3%	1985 20% 1987 -	Total Supra (R) ADABAS	8% 6%

<u>MINI</u>	HP - HP provides DBMS as part of its operating system	
DEC		27%
ORACLE (Public)	Direct/VAR/180	12% 19% ORACLE 26%
RELATIONAL (Pri.)	Direct/VAR	60 7-8% - INGRES 20%
INFORMIX (Public)	Direct/VAR	21 1986 11.7 16% INFORMIX 9% 42 1987 14.3 22%

MICRO

ASHTON TATE (Pb.)	Retail/ NTL Accts.	150	16% 26%	DBASE R:BASE	60%
MICRORIM (Pri.)	Retail/ NTL Accts.	25	10% 22%	SYSTEM V SYSTEM5000	10%
BORLAND (ANSA) (Pb.)	Retail/ NTL Accts	14	-- --	PARADOX	4%

Note:
the arrows point
to the column the
information pertains to

Representative Market to Book
(\$ in millions)

Company	Stock Price 3/88	Shares (thousands)	Market	Book	Market/Book
CULLINET	6-1/8	32,184	197.1	119.3	1.65
ORACLE	15	66,482	997.2	82.6	12.1
INFORMIX*	20	9,516	190.3	15.7	12.12
ASHTON-TATE	29-3/4	23,902	711.1	122.4	5.8
SOFTWARE AG	12-3/4	5,855	74.7	44.7	1.7

*Does not include Innovative Software.

- Note:
- 1.) ORACLE, RELATIONAL, INFORMIX all have some revenue in the micro and mainframe sectors although not to the level of a major market participant. However, they are well-poised to implement distributed DBMS systems across heterogeneous platforms.
 - 2.) CULLINET, CINCOM AND SOFTWARE AG have all announced and released products for the DEC VAX family of computers. Cullinet's has just been shipped with the other 2 shipping for 18 months. ADR has not announced any intention to offer product outside the IBM mainframe.

SECTOR: DATABASE MANAGEMENT SYSTEMS

2. COMPETITIVE RIVALRY

A. Sector Size, Growth and Profitability

MAINFRAME (\$ in millions)

size 1987	\$1,150	1992	\$2,100	AAGR 12%
margin (ATE)				
entire:	+10% loss to 6% profit			
dominant:	same			

MINI

size 1987 \$510 1992 \$1,900 AAGR 30%
margin (ATE)
entire: break even to 18% profit
dominant: 7% to 18%

MICRO

size 1987 \$525 1992 \$1,800 AAGR 28%
margin
entire: +7% loss to 16% profit
dominant: 16%

- Notes:
- o MAINFRAME DBMS growth is a lackluster 12% due to
 - low growth rate of mainframes 7-8%
 - increase in distributed DBMS which most mainframe DBMS vendors have been slow to develop
 - market saturation
 - o MINIframe DBMS is growing at an outstanding 30% rate due to the
 - increased growth of mini platforms or departmental systems
 - the initial acceptance of distributed DBMS application and the expected increase of its utility. This highly favors companies such as: Oracle, Relational and Informix.
 - emerging transaction-oriented DBMS being offered by SYBASE (Berkeley, CA) and INTERBASE (617 and a spin-off of DEC people)
 - o MICRO computer DBMS is growing at an outstanding 28% rate due to the
 - increased growth of micro platforms
 - the acceptance of the PS/2 and its eventual clones
 - the improved price/performance per MIP and per M byte of disk storage

SECTOR: DATABASE MANAGEMENT SYSTEMS

2. COMPETITIVE RIVALRY

B. FIXED COST

MAINFRAME

PRIMARY ACTIVITIES

a.) Inbound

SUPPORT ACTIVITIES

f.) FIRM Infrastructurer

b.) Operations (mfg)	g.) included in d
c.) Outbound logistics	HR mgmt. included in d
(DIS)	h.) Technology Dev. 20-30%
d.) Marketing and Sales 65-80%	i.) Procurement
e.) Service	

Note: Mainframe participants are all spending a large percentage of their revenue to dynamically change direction to enter the mini and micro markets with either products or linkages

MINI

a. --	f. 6-14%
b.)}	g.) included in F
c.)} 8-12%	h.) 6-12%
d.) 45-60%	i.)
e.) 10-15%	

MICRO

a.) --	f.) 20-25%
b.)}	g.) included in F
c.)} 15-20%	h.) 10-15%
d.) 22-28%	i.) --
e.) 10-15%	

SECTOR: DATABASE MANAGEMENT SYSTEMS

2. COMPETITIVE RIVALRY

C. CYCLICAL SUPPLY/DEMAND

MAINFRAME

- o Demand related to number of hardware boxes. There has been a slow down as industry is tending towards decentralization. This is a trend observed to occur every 7-10 years since 1960.
- o Mature market participants release enhancements and buy fixes annually causing renewed interest
- o # of vendors reasonably steady

MINI

- o Demand related to number of hardware boxes. Department systems growth unabated for next couple of years

- o Functionality needs changing - room for new vendors
- o Several new vendors are SYBASE, INTERBASE

MICRO

- o Demand related to number of hardware boxes
- o Growth in major increase phase as high functionality local processing becomes member of mission critical application
- o Too many vendors and increasing as mainframe/mini vendors introduce lower entry compatible products

SECTOR: DATABASE MANAGEMENT SYSTEMS

2. COMPETITIVE RIVALRY

D. PRODUCT DIFFERENTIATION/BRAND IDENTITY

MAINFRAME

- o Difference are between major manufacturer (IBM) and independents
- o Differentiation based on price/performance
- o IBM's DB2 emerging as major "brand"

MINI

- o Product differences minimal based on pushing functionality and performance
- o ORACLE is the dominant "brand"

MICRO

- o Little product differences
- o DBASE is dominant "brand"

SECTOR: DATABASE MANAGEMENT SYSTEMS

2. COMPETITOR RIVALRY

E. MARKET FRAGMENTATION/FRAGMENTATION

MAINFRAME

- o Market leaders are Cullinet, ADR, Cincom, Software AG, IBM (DB2 & IMS)
- o Market share is 15 , 11 , 8 , 6 , 40, respectively
- o Current market leader is IBM's DB2, current independent market leader ADR. By installed base independent market leader is Cullinet.

- o Cullinet has been losing money and not selling as much DBMS as it had in the past.

MINI

- o Market leaders are ORACLE, Relational Technology, Informix, DEC
- o Market Share is 26% 20%
Informix 9%, DEC 27%
- o Current leader is ORACLE. It has ported its software to virtually all mini platforms and is outselling its nearest independent rival by more than 2 to 1
- o RTI's growth has picked up to almost 70% from the previous year's 60%. Earnings are in the 6-8% ATE.
- o Informix was at a run rate of \$40 million per annum when it recently acquired Innovative Software (at a \$28 million run rate). Innovative offers a sophisticated OA system on the micro which includes a feature-rich DBMS.

MICRO

- o Market leaders are Ashton-Tate, Microrim, Borland
- o Market share is 60 10 4
- o Current leader is Ashton-Tate. However, the market dynamics are shifting in the corporate arena due to the importance of standards i.e. SQL. The extended release of OS/2 will cause more attention on PS/2

SECTOR: DATABASE MANAGEMENT SYSTEMS

2. COMPETITIVE RIVALRY

F. COMPETITOR DYNAMICS

MAINFRAME

- o Competitors are quite similar in their approach to the market.
- o Their marketing and sales process is similar in nature and very professional
- o Growth has been mostly an evolution until 1986 when two events occurred.
 - IBM stalled the market with a marketing program for DB2 providing a 6 months no charge license
 - The shift toward departmental systems picked up steam and users bought mini systems (departmental)
- o Only ADR seems to have finally rebounded from the significant revenue declines

MINI

- o Competitors are quite similar being very professional and customer-oriented
- o Dynamics have been based on the surge of departmental systems being procured under the responsibility of "end-user" buying authority
- o The new decision point allowed new companies to emerge
- o Market shares have changed to the independents from the manufacturers yielding ORACLE, Relational Technology and Informix as fast growing players in the market.
- o All the competitors are expressing an open architecture and are attempting to add many more hardware platforms.
- o The leading DBMS vendors are also adding additional services such as consulting, CASE, DB2 support.

MICRO

- o Ashton-Tate dominates. There is strong competition based on functionality and price for the small or independent end user
- o Corporate users generally are told what to purchase to provide uniformity within the corporation
- o While there has been no market share changes in several years, the recent IBM PS/2 with OS/2 may open up the possibility of a shift based on the corporate desire for Structured Query Language (SQL). SQL is a standard and IBM has announced support.
- o Ashton-Tate does not currently support SQL. This opens up the door to new vendors
- o SYBASE, an emerging company with revenues of \$6 million in 1987, has entered into a deal with Microsoft (and Ashton-Tate) to support a SQL Server. Also, Apple has made an equity investment in SYBASE and announced a SQL Server strategy as well.

SECTOR: DATABASE MANAGEMENT SYSTEMS

2. COMPETITIVE RIVALRY

G. CORPORATE STAKES

MAINFRAME

- o IBM's DB2 has been declared a strategic product by IBM. Thus, it will be enhanced and supported for quite some time. Control of the DBMS is extremely important for account control. Most new applications will use a DBMS to manage the data

- o For the independents, their DBMS offerings were core business and viewed as cash cows. This has changed (see 2.F). Each of the mainframe independents has added complementary products called 4GL's that have helped them through the last 2 year's difficult times. Cullinet has acquired several companies to enter the banking applications industry, ADR has sold IDEAL (a 4GL), Cincom has entered into manufacturing and networking, Software AG has sold Natural (a 4GL).

MINI

- o DBMS represents a core business for each of the independents
- o DBMS is a strategic product for the manufacturers
- o The business has been a cash-cow for the independents allowing most of them to launch new product thrusts or new business segments. See table.

ORACLE	new segments: consulting, CASE, industry-specific application
Relational	new segments: consulting (through a relationship with Computer Task Group)
Informix	new business: merger with Innovative Software

MICRO

- o DBMS has been an immense cash-cow for Ashton-Tate. It has acquired additional applications in word processing, desktop publishing, graphics growing the overall company by 40%
- o DBMS for the other micro vendors is their primary business

SECTOR: DATABASE MANAGEMENT SYSTEMS

2. COMPETITIVE RIVALRY

H. EXIT BARRIERS

General note: There are no exit barriers per se. in the DBMS software business. If a competitor left the sector, it would be tantamount to closing its doors.

MAINFRAME

- o Most independents are grappling with a strategy of continuing their DBMS efforts to placate their installed bases while groping for additional product

- o Leveraging installed base into additional application development tools
- o Independents (except ADR) collectively seem to be embracing the DEC product line

MINI

- o Need to satisfy installed base

MICRO

- o Need to satisfy installed base

SECTOR: DATABASE MANAGEMENT SYSTEMS

3. ENTRY BARRIERS

A. LEARNING CURVE

For all three platforms, there are significant similarities

- o Scale to a degree is necessary to support the corporation's infrastructure. However, scale in the traditional sense can be reached at fairly low revenue levels
- o Due to the high maintenance revenues for product support and enhancement, competitors do tend to become more profitable the longer they are in business. Note: This is partly why the mainframe competitors have been able to "survive" after the 1986 IBM marketing effort for DB2

SECTOR: DATABASE MANAGEMENT SYSTEMS

3. ENTRY BARRIERS

b. CAPITAL REQUIREMENTS

MAINFRAME

- o Independents have a reasonably high capitalization, especially those that have gone public
- o Capitalization required to support the on-going business and is what has allowed the mainframe participants to roll with the marketing wave
- o Capitalization has allowed the mainframe independents to continue major R&D expenditures, support large marketing and sales organizations and continue the enterprise's business in spite of difficult times

MINI

- o Moderate capitalization is required to play in this market e.g. SYBASE has had approximately 8-10 million invested prior to its product launch
- o Mini independent vendors have not been in business as long as mainframe vendors so they have not increased their capitalization to the same extent
- o Public independents are relatively cash-rich e.g. ORACLE, Informix

MICRO

- o High capitalization for Ashton-Tate due to immense success in public market and in growth of company
- o Other independents tend to be of small capitalization
 - program development does not take much capital
 - Sales/Marketing/Distribution/Product launch takes much capital and is generally under-estimated

SECTOR: DATABASE MANAGEMENT SYSTEMS

3. ENTRY BARRIERS;
- C. COMPETITIVE ADVANTAGE non-cost)

MAINFRAME

- o Installed base is a significant factor for each of the independents
- o Expertise in working in the IBM systems area
- o Key software developers are not abundant
- o Brand identity is high for each independent mentioned in this report

MINI

- o Independents have latched on to SQL technology and cultivated expertise
- o Relational Technology has major rapport with U.C. Berkeley, a hotbed of DBMS technology
- o

MICRO

- o Ashton-Tate has major distribution channel advantage i.e. relationships are established and plentiful
- o Distribution channel flows with the best-sellers i.e. follows consumer's buying interest

- o Ashton-Tate, Microrim, Borland all have installed bases i.e. brand identity

SECTOR: DATABASE MANAGEMENT SYSTEMS

3. ENTRY BARRIERS

D. RETALIATION

MAINFRAME

- o Retaliation would be based on who the new entrant is:
 - For PACIFIC TELESIS the retaliation would be similar to Ameritech's entry through ADR
 - RBOCs are not generally perceived to have any industry/cross-industry expertise in software products
 - Recent success of ADR in revenue growth could garner respect of others in this sector. Certainly, ADR would have little comment

MINI

- o Competitors are likely to question the strategy and merit of entering this market. Is it an investment?? What's the purpose??, etc..
- o Smaller competitors will look at ways to not show concern due to no perceived technical process or fundamental fit observed
- o Competitors will take notice of a new entrant that has significant resources

MICRO

- o Similar to above, the competitors will question the strategy and business fit, but be concerned of the "deep pockets"
- o Since there are many small micro-oriented competitors, there may be the perception that they will have a more difficult time of it due to a new well-capitalized entrant.

Note: Overall retaliation does not seem a difficult issue

SECTOR: DATABASE MANAGEMENT SYSTEMS

4. SUPPLIER BARGAINING POWER

These comments are generally applicable across all three hardware platforms

- o Programmers and technical talent are a difficult resource to attract and retain in the software business
- o The talent tends to be most scarce in the mainframe area because the operating system and internals are not generally taught in the typical computer science programs in the university system
- o Mini and micro programmers are thereby a little easier to find. But since there is an abundance of positions the programmer has significant choice.
- o TOP TALENT is retained through job enrichment and satisfaction, stock options (where available), and new and interesting assignments

